



Indications and Complications of Limb Amputation in Tamale, Ghana

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Abstract

Background: Amputation is the removal of whole or part of a limb or any body part by cutting through a bone, a joint or that body part. The permanent loss of these body part(s) exert stress physically, emotionally, psychologically and economically on the patient, his family and the society at large. The incidence and indications of limb amputations varies. The objective of this study was to determine and high-light the indications and complications of limb amputations in Tamale, Ghana. Methods: a retrospective study covering a 5-year period, from January 2007 to December 2012, involving 160 patients was undertaken, in Tania specialist hospital, Tamale, Ghana. Patients medical records were retrieved and examined, considering demographic factors including age and gender, Level of amputation, indications for amputation, complications after amputation and the final outcomes were also determined. The post-operation follow-up schedule was as follows; end of first week, end of first month, end of third month and end of sixth month. The inclusion criteria of all participants were; all cases referred or not referred to Tania specialist hospital from January 2007 to December 2012 who had limb amputations performed in Tania specialist hospital. Also those with previous amputation(s) done elsewhere qualified for the study if there was a written referral letter indicating the indications for that amputation and if the reasons for that referral (complications) were clear to us. Results: a total of 160 patients were recruited for the study. These patients were between the ages of 2 and 70 years, with a male to female ratio of 4:1. There were 160 unilateral limb amputations. The sites of amputation were lower limb 131 patients (81.88%) and upper limb 29 patients (18.14%), the main indications for amputation were severe trauma, 50 (31.25%), gangrene, 32 (20.0%), compartment syndrome 25 (15.63%). Of the other indications, malignant tumors were 12 (7.5%), The commonest complications after amputation were wound infections 10 (6.25%) and depression 5 (3.13%). There were no deaths or tetanus cases recorded. Conclusion; males were four times at risk of been amputated and lower limb to upper limb amputation ratio was 4:1. The main indications for limb amputations were severe trauma, gangrene and compartment syndrome. Councelling services should be provided to patients both pre-operatively and post-operative to help prevent and/or manage the depression.

Keywords: Incidence, Indications, Complications, Amputations, Northern Ghana.



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1. Introduction

Amputation is derived from the Latin word “Amputare” meaning ‘to cut away’. Amputations are among the oldest surgical procedures done dating back to over 2,500 years [1]. The first surgical description of a leg amputation was by Hippocrates (460-377 BC). Amputation is also defined as the intentional surgical removal of a limb (complete or incomplete) or body part through a bone or a joint. It is performed to remove diseased tissue(s) or to relieve pain. Arms, legs, hands, feet and toes can be amputated among other parts of the body. In the United States of America, there are nearly 2 million people living with limb loss [2] with about 185,000 amputations occurring each year [3]. The main indications for amputations among those living with limb loss in western countries are vascular diseases (54%), including diabetes and peripheral arterial disease, trauma (45%) and cancer (less than 2%) [2]. The male sex is the one most frequently involved in amputations [4]. The loss of a limb by any individual has profound economic, social and psychological effects on the individual and their family. This is more pronounced in developing countries where the males are often the sole bread-winners of the family [5]. Prosthesis are usually recommended and prescribed for amputees to use to minimize their stress and incapacities. Problems encountered in prosthesis acquisition in Ghana include non-availability, inaccessibility and non-affordability of the obsolete prosthetic gadgets. There is also the lack of trained personnel to assist these amputees, there-by worsening amputees’ plights.

2. Methods

This was a retrospective study covering a 5-year period, from January 2007 to December 2012, involving 160 patients was undertaken, in Tania specialist hospital, Tamale, Ghana. Patients medical records were retrieved and examined, considering demographic factors including age and gender, Level of amputation, indications for amputation, complications after amputation and the final outcomes were also determined. The post-operation follow-up schedule was as follows; end of first week, end of first month, end of third month and end of sixth month. The inclusion criteria of all participants were; all cases referred or not referred to Tania specialist hospital from January 2007 to December 2012 who had limb amputations performed in Tania specialist hospital. Also those with previous amputation(s) done elsewhere qualified for the study if there was a written referral letter indicating the indications for that amputation and if the reasons for that referral (complications) were clear to us. The data was entered into microsoft excel and analysed.

3. Results

Amputations were performed on 160 patients. These comprised of 128 (80%) males and 32 (20%) females. The age ranges of the patients were between 2 and 70 years.

The distributions of the levels of amputations are shown in tables 1 and 2. There were 131(81.88%) upper limb amputations.

Table-1. Frequency of amputation — lower limb

Part of limb	Frequency	%
Digits (toes)	10	6.25
Lisfranc	6	3.75
Chopart	3	1.88
Below knee (transtibial)	72	45.00
Above knee (transfemoral)	40	25.00
Sub-total	131	81.88

The greatest number of lower limb amputations were below knee (transtibial) amputations 72 (45.00%) followed by above knee (transfemoral) amputations 40 (25.00%).

Table-2. Levels of amputation — Upper limb

Part of limb	Frequency	%
Digits (fingers)	3	1.88
Metacarpal	1	0.63
Forearm (transradial)	10	6.25
Above elbow (transhumeral)	15	9.38
Sub-total	29	18.14
Total	160	100

The most common upper limb amputation was above elbow (transhumeral) amputations 15 (9.38%) followed by forearm (transradial) amputations (Table 2).

Table-3. Indications for Amputations

Indications	No of Amputations	%
Severe trauma (mangled limb)	50	31.25
Gangrene		
Traditional bone setters (TBS) Gangrene	20	12.50
Diabetic Gangrene	10	6.25
Vascular Gangrene	2	1.25
Sub-total Malignant tumors	32	20.0
Osteosarcoma	7	4.38
Rhabdomyosarcoma	3	1.88
		<i>Continue</i>

Others	2	1.25
Sub-total	12	7.51
Sepsis		
Chronic osteomyelitis	10	6.25
Severe surgical site infection	10	6.25
Gunshot wounds	10	6.25
Septic elephantiasis	6	3.75
Severe Burns	5	3.13
Sub-total	41	25.63
OTHERS		
Congenital abnormalities	0	0.00
Compartment syndrome	25	15.63
Sub-total	25	15.63
Total	160	100.00

Out of the many indications for amputations, severe trauma (mangled limbs) were the most common 50 (31.25%) followed by gangrene 32 (20.0%), then 25 (15.63%) were due to compartment syndrome and 10 (6.25%) were each due to chronic osteomyelitis, severe surgical wound- site infection(s) and gunshot wounds. Out of the 32 amputations indicated by gangrene, 20 (62.5%) were associated with traditional bone setters (TBS) gangrene and 10 (31.3%) were diabetic gangrene. Of the 7 amputations indicated by malignant tumors, 7 (58.3%) were caused by osteosarcoma (Table 3).

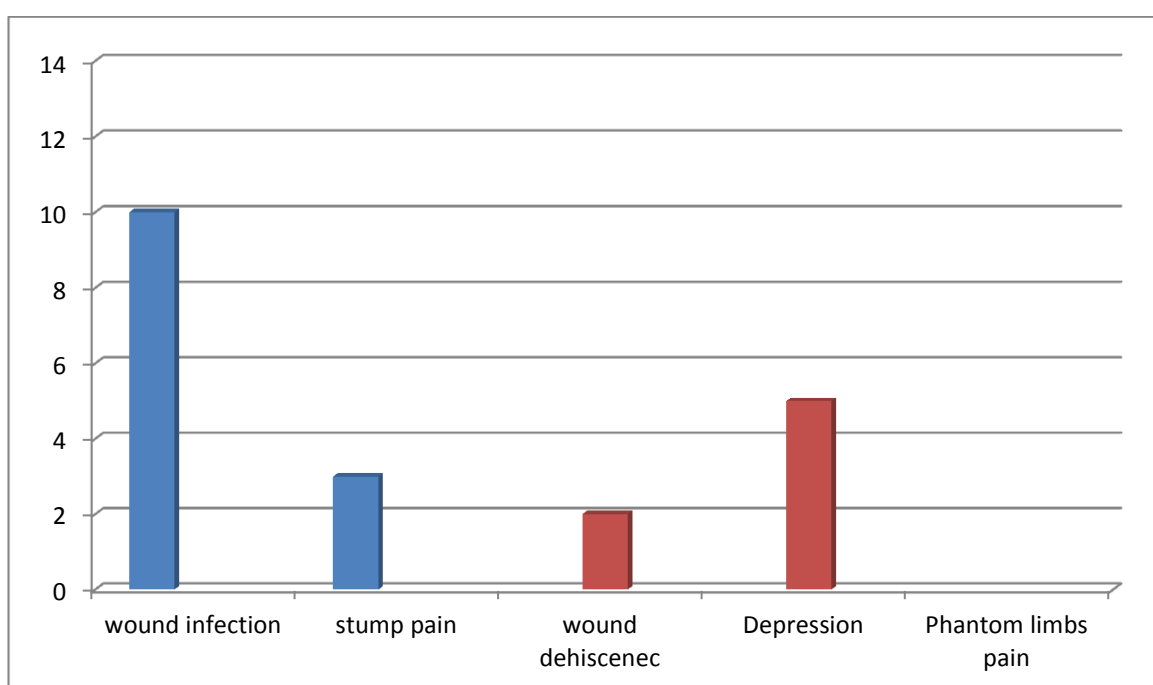


Figure-1. complications associated with amputations

The major complications observed after amputations were wound infection 10 (50.0%) and depression 5 (25%) followed by stump pain 3 (15%). There were no complications due to phantom limb pain and no deaths (Figure 1)

Table-4. Indications for amputation in amputees referred from other health institutions

Complications	Indications for amputation	No	%
Wound infection	Severe trauma	3	27.27
	TBS gangrene	1	9.09
	Diabetic gangrene	1	9.09
	Sub-total	5	45.45
Wound dehiscence	Tumor	1	9.09
	Diabetic	1	9.09
	Sub-total	2	18.18
Stump osteomyelitis	Trauma	1	9.09
	Diabetes	1	9.09
	Chronic osteomyelitis	1	9.09
	Sub-total	3	27.27
Stump protrusion	Trauma	1	9.09
Total		11	100.00

The most common indication for amputations in amputees referred from other health institutions was wound infection 5 (45.45%). Of the referrals with wound infections, 3 (27.27%) were cases of severe trauma (mangled limb) and the rest being TBS gangrene and diabetic gangrene (Table).

4. Discussions

Amputation can sometimes be the management of choice for certain situations; Mangled limb (Trauma) [6] prolonged vascular occlusion disease with soft tissue infarction, incurable malignant tumors and polydactyly among

others. It is most undesirable in preventive disease conditions; such as neglected trauma cases, aseptic techniques in open fracture cases, uncontrolled diabetes mellitus just to mention a few. The decision to perform amputation often comes after all other options have been exhausted. It is a final decision that cannot be reversed once initiated [1].

In the present study trauma was the commonest indication for limb amputation in this study which is similar to the findings of Olasinde, et al. [6] in Nigeria, where trauma accounted for 73.4% of amputations even though the figure is lower in the present case. In most of these trauma cases inappropriate initial management is a key factor leading to amputations. In other cases late reporting to specialist clinics makes it impossible to initiate proper initial management practices such as re-vascularization and stabilization of the affected limbs. The situation is the same across several African countries as reported by [7-10].

In Ghana, most patients find it very difficult to consent for limb amputation similarly reported by Olasinde, et al. [6] for cultural reasons, this is because some royals may forfeit their rights to kingship and chieftaincy, just because of amputation of any of their body part(s). There is also the issue of socio-psychological stigma associated with limb loss. Amputees are considered incomplete. These people need our support and encouragement, as well as the appropriate prosthesis and training guide to become economically and socially productive in life once amputated.

This study has highlighted that the male to female ratio of limb amputation is 4:1. This is contrary to 2:2:1 reported in Nigeria by Obadum and Okeke [9].

Gangrenous limb was the second most common indication for limb amputation. However, in the developed countries, it is not among the leading indications for amputation [2, 3, 11]. Most patients reported late to Tania specialist hospital when extensive gangrene has occurred, and the revascularization and limb salvage was not a possible option. The unhygienic procedures employed by traditional bone setters (TBS), and the tightening of fractured limb with sticks and cloths accelerated ischaemia and sepsis [6-8].

Diabetics with complications requiring amputations mostly occurred in patients within the 4th, 5th and 6th decades of life [11]. The changing trends of Ghanaians' diet towards that of the western world, lack of physical activity (use of automobiles) and the increase in the number of "white collar" jobs might have contributed significantly to the increase in the number of diabetics among Ghanaians. As Amoah [12] reported, high incidence of diabetes mellitus in Greater Accra, Ghana, is a changing trend. The lack of adequate physician specialists and the non-availability of vascular surgeons in Northern Ghana, further worsen the situation. This accounts for the relatively high number of diabetic gangrene cases 10 patients (6.25%) in this study. Literature states that the risk of amputation of a lower limb is increased up to 15 fold in diabetic patients [5, 11]. Factors contributing to this include sensory neuropathy, motor neuropathy causing gait abnormality and deformity; autonomic neuropathy, causing abnormal blood flow; macrovascular diseases causing ischaemia; poor glycaemic control causing increased risk of infection; inadequate care of infection and ulceration of limb is also a potentiating factor for limb amputation [4, 11].

Vascular gangrene is still low, as only 2 patients, both were above 60 years (1.25%) were amputated due to that. This is however, one of the leading indications for limb amputation in the western world [2, 11].

The high incidence of compartment syndrome necessitating amputation was very unfortunate. This could have been prevented [13]. Health care workers and the ambulance service providers from both the public and private sectors need in-service training, particularly in trauma case management to minimize the future occurrence of compartment syndrome. Amputations due to gunshot wounds were relatively high (6.25%) which could be attributed to the frequent ethnic and chieftaincy conflicts in Northern Ghana. Septic elephantiasis, a neglected tropical disease accounted for 3.75% of the amputations. The main complications following limb amputations were wound infection and depression.

The indications for re-amputation were wound infection 5 (45.45%). Stump osteomyelitis 3 patients (27.27%) and wound dehiscence 2 patients (18.18%) of cases.

No tetanus or deaths were recorded in this study. This is contrary to Olasinde, et al. [6] that reported incidence of tetanus and also recorded six (6) deaths from sepsis. We recommend the availability of high quality biomedical scientists with state of the art laboratories in Northern Ghana to provide quality services and also capacity building for general practitioners who perform amputations.

5. Conclusion

Most limb amputations were done on young adult males (male: female ratio; 4:1) and the lower limb to upper limb ratio was also 4:1. The main indications for limb amputations were severe trauma, gangrene and compartment syndrome. Counselling services should be provided to patients both pre-operatively and post-operative to help prevent and/or manage depression.

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